

**ABSTRACT**

Photon welding devices of this invention comprise a non-coherent photon source, and a light pipe coupled to the photon source at one end. A thin mask is positioned at another end of the light pipe that defines a weld location for photon delivery. A work
5 piece to be bonded by the device comprises a top layer of transparent plastic and a base layer of absorbing plastic. The thin mask is in the form of a reflective coating positioned on the end of the light pipe over all surfaces that are not in contact with the work piece. A device includes a member that imposes a controlled, compressive force to the work piece while it is being welded and during a short time thereafter. The device
10 also includes a member that maintains a desired alignment of the light pipe, top layer of the work piece, and base layer of the work piece during the bonding cycle.